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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/709,020	11/08/2000	Christoph Benning	MSU-04769	3130

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EXAMINER	
PAK, YONG D	

ART UNIT	PAPER NUMBER
1652	

DATE MAILED: 03/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/709,020	BENNING ET AL.	
	Examiner	Art Unit	
	Yong D. Pak	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,13 and 15-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,13 and 15-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

In view of the Appeal Brief filed on December 21, 2005, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing at the end of this Action.

Claims 1, 13 and 15-40 are pending and are under consideration.

Response to Arguments

Applicant's amendment and arguments filed on December 21, 2005, have been fully considered and are deemed to be persuasive to overcome the rejections previously applied. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn.

Claim Objections

Claim 1 is objected to for the use of the phrase "nucleic acid" in line 7 whereas the phrase "nucleic acid sequence" is used in the claims. To achieve uniformity, applicants are urged to amend the phrase to "nucleic acid sequence".

Claims 20 and 29 are objected to because "E.coli" is not italicized. Applicants are urged to amend the claims as "*E. coli*".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 13 and 15-16 and claims 35-38 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 13 and 15-16 recite the term "peptide" encoded by SEQ ID NOs: 1, 3 or 6. Since SEQ ID NOs: 1, 3 and 6 encode enzymes, "polypeptides" are encoded by said SEQ ID NOs, not "peptides". Examiner suggests amending the term as "polypeptide".

Claims 1, 13, 15, 17 and 26 and claims 18-25, 27-37 and 39-40 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 13, 15, 17 and 26 recite the phrase "as set forth in". The metes and bounds of the phrase in the context of the claims are not clear. It is not clear to the Examiner if the recited nucleotide sequence has the nucleic acid sequence of SEQ ID NOs, 1, 3 or 6 or is a representative member of a genus. Examiner suggests amending the phrase as "the nucleic acid sequence of SEQ ID NO:" to clearly indicate that the nucleic acid used in the method has the nucleic acid sequence of SEQ ID NOs: 1, 3 or 6.

Claim 16 and claim 38 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 16 recites the phrase "corresponding to". The metes and bounds are not clear in the context of the claims. It is not clear to the Examiner from the specification or from the claims as to what polynucleotides "correspond to" SEQ ID NO:1, 3 or 6. Examiner suggests direct reference to the SEQ ID NO.

Claims 15-16 and claims 37-38 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 15-16 recite the phrase "such that a peptide is expressed... isolating said expressed peptide; and reacting ... said peptide". The metes and bounds of this phrase in the context of the above claims are not clear. A host cell transfected with SEQ ID NO:6 expresses the peptide encoded by SEQ ID NO:6 and many other peptides. Therefore, it is unclear to the Examiner which "peptides" are isolated and reacted with UDP-glucose. Examiner requests clarification of the above phrase.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 13, 15 and 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Essigmann et al..

Claims 13, 15 and 36-37 are drawn to a method of producing UDP-sulfoquinovose (UDP-SQ) comprising reacting UDP, sulfite and a polynucleotide, SEQ ID NO:6, encoding a SQD1 protein or a host cell comprising said polynucleotide.

Essigmann et al. (*Arch Biochem Biophys. 1999 Sep 1;369(1):30-41* –cited on form PTO-1449) discloses the pathway for producing UDP-SQ by reacting UDP-glucose, sulfur donor and SQD1 (Figure 9, page 39). Essigmann et al. also discloses a host cell expressing SQD1 protein encoded by a polynucleotide that is 100% identical to SEQ ID NO:6 of the instant invention and isolation of said protein (abstract, pages 32 and see Sequence Alignment – form PTO-892). Essigmann et al. teaches that SQD1 protein is "involved in the formation of UDP-sulfoquinovose" (abstract). Essigmann et al. also teaches that a sulfur donor is needed for the formation of UDP-SQ (Figure 9 and page 40).

The difference between the reference of Essigmann et al. and the instant invention is that the reference of Essigmann et al. does not explicitly teach using sulfite as the sulfur donor.

However, Essigmann et al. does teach that sulfite may be used as the sulfur donor (page 40). With this teaching at hand, it would have been well within the level of skill known in the art to use sulfite (or other sulfur donors such as a sulfate) as the sulfur donor in enzymatically producing UDP-SQ from UDP-glucose.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to produce UDP-SQ by reacting UDP-glucose, sulfite and SQD1 protein of Essigmann et al., wherein said SQD1 protein is isolated from a host cell transformed with the polynucleotide encoding said protein. One of ordinary skill in the art would have been motivated to produce UDP-SQ using enzymatic biosynthesis methods instead of chemically synthesizing UDP-SQ or isolating UDP-SQ from plants and to use sulfite as the sulfur donor. One of ordinary skill in the art would have had a reasonable expectation of success in producing UDP-SQ because Essigmann et al. teaches a pathway for producing UDP-SQ, such as UDP-glucose, sulfur donor and a polynucleotide encoding a SQD1 protein which is involved in formation of UDP-SQ from UDP-glucose, expression of said protein in a host cell transformed with said polynucleotide and isolation of said product and Essigmann et al. teaches that sulfite can be used as the sulfur donor.

Therefore, Essigmann et al. render claims 13, 15 and 36-37 *prima facie* obvious to those skilled in the art.

Applicants have filed a declaration under 37 CRF1.132 against Essigmann et al. Applicants argue that Essigmann et al. is completely silent on how the enzyme works, whether the enzyme must be an active protein, how one would express and isolate such an active protein or how one would assay its activity. Examiner respectfully disagrees. Essigmann et al. does indeed teach how the enzyme works (abstract), whether the enzyme must be active (abstract), how one would express and isolate the protein (page 32) or how one would assay its activity (page 32).

Applicants also argue that Essigmann et al. does not disclose all of the four critical elements of the enzymatic biosynthesis of UDP-SQ; active SQD1 enzyme, UDP-glucose, sulfite and the appropriate buffer conditions. Examiner respectfully disagrees. As discussed above, Essginmann et al. does indeed disclose an active SEQ1 enzyme, UDP-glucose and sulfite. Regarding the buffer conditions, since the claims do not recite a specific buffer condition, any buffer conditions read on the claims.

Applicants also argue that the discussion of "sulfur donor" in Essigmann et al. is made within the context of a chemical synthesis scheme, not enzymatic biosynthesis methods, and therefore, Essigmann et al. does not disclose that sulfite is "the" sulfur donor. The rejection is an obviousness rejection and not an anticipation rejection. Since Essigmann et al. teaches that sulfite may be the sulfur donor, one having ordinary skill in the art having this teaching at hand would have been motivated to use sulfite as the sulfur donor in an enzymatic biosynthesis method of producing UDP-SQ.

None of the claims are allowable

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yong Pak whose telephone number is 571-272-0935. The examiner can normally be reached 6:30 A.M. to 5:00 P.M. Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapu Achutamurthy can be reached on 571-272-0928. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-8300 for regular communications and 703-872-9307 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600.

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